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ABSTRACT

Brevard Community College (BCC), in Florida, undertook a review of enrollment, social and workplace trends, and institutional capabilities to determine opportunities, barriers, and implications for the institution in implementing distance education (DE) and instructional technology. Trends analyzed included enrollment shifts toward older students, economic needs for increased workforce retraining, and technological innovations in the workplace. To help determine opportunities for DE created by these trends, two national studies of college practices were reviewed, finding an increasing number of connections to the Internet, widespread offering of DE courses, and predicted increases in courses using electronic materials and distance technologies. Barriers identified included resistance to change among the culture that defines education as a classroom process rather than a learning-centered process and the need to increase the emphasis on customer service and value-added benefits. Based on these analyses, BCC developed recommended strategies and goals for implementing DE and technological innovation and developed a Distance Learning and Technology Plan. The Plan addresses institutional strategies related to technological innovations, including television systems, satellite service, computer-assisted instruction, and the Internet; curricular strategies; and learner support strategies. The Plan also addresses inter-institutional strategies for the 54 Florida community college campuses related to telecommunications infrastructure, hardware and facilities, and technology-based and DE courseware development, as well as strategies for forming DE partnerships. Diagrams of three computer system configurations are appended. (BCY)

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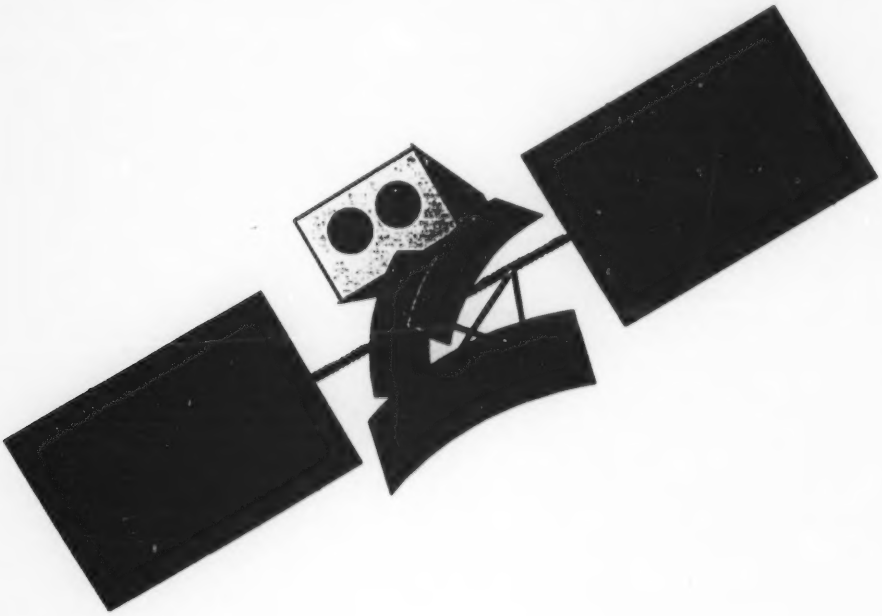
ED 402 957

BREVARD COMMUNITY COLLEGE

COCOA, FLORIDA

Distance Learning and Technology Plan



Submitted to:
Florida State Board of Community Colleges

by:
Maxwell C. King
District President

on:
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

BREVARD COMMUNITY COLLEGE

Distance Learning and Technology Plan

In conjunction with recent statewide studies on distance learning and instructional telecommunications, and the establishment of the Florida Distance Learning Network (FDLN), **Brevard Community College (BCC)** has analyzed and reviewed enrollment, societal and workplace trends, as well as its institutional capabilities in distance learning and instructional technologies. The information which follows describes the trends; the opportunities and challenges; the threats and barriers; the implications for the institution; and, the strategies for the implementation of a BCC distance learning and instructional technology plan.

A. Distance Learning and Technology Plan: Needs Assessment

1. **Trends Analysis: Overview -** Enrollment shifts, economic forces, and technological innovations are changing the marketplace, the workplace, and, somewhat more slowly, our colleges and universities.

   Enrollment Shifts - The National Center for Educational Statistics (NCES) notes that of the 14 million higher education students in the U.S., only 3 million students attend college full-time in residence, and are less than 22 years of age. Currently, 42 percent of all undergraduates in the U.S. are 25 years of age and older. A study conducted by the Annenberg/CPB Project forecasts that, by the year 2000, the majority of college students will be 25 years of age and older. NCES notes that college enrollment will only increase 5 percent among students under 25, but a 16 percent increase is projected among students over 25 through the year 2000.

   Looking beyond the year 2000 through about 2008, the nation's high school graduating classes will increase by more than 34 percent. Florida will experience a 51 percent increase in the number of students graduating from high school during the period of 1995 through 2008. This is not speculation. These are students already born and most of them are already in the education pipeline.

   As a result of these trends, higher education will be faced with a tidal wave of students and fewer resources and facilities to accommodate their needs. The majority of students are expected to be working adults who will be seeking training, retraining, certification, and credentialling to meet the changing needs of a highly competitive workplace.

These students will approach higher education with a consumer orientation and will expect and demand convenience of learning, enhanced access, asynchronous communications, and a consumer service-oriented environment.

Economic Forces - Higher education will need to be a change agent in order to facilitate the training and retraining of the workforce. According to "Workforce 2000," over half of the new jobs of the future will require postsecondary education and training. Current projections forecast that 75 percent of the workforce will need significant retraining in the next decade. Moreover, 80 percent of the workforce of the year 2000 is already in the workplace today. As for new workforce entrants, 69 percent will be women and minorities. The workforce transition and the task of higher education is evidenced in the shift from unskilled to skilled labor. In 1950, Florida's economy accommodated a workforce that was nearly two-thirds unskilled. As of 1990, the percentage of unskilled jobs in America had fallen to 35 percent, and it is expected to drop to 15 percent by the year 2000. Evolving jobs force changes in education!

Technological Innovations - Faced with global competition, manufacturers and service industries have turned to technology to boost productivity, substituting machines for people wherever possible. In recent years, the service sector has undergone the upheaval first experienced by manufacturers. Telephone operators are being replaced by automated switching equipment and computer voice mail, gas station attendants are being replaced by pumps that accept credit cards, secretaries are being replaced by computers, and bank tellers are being replaced by automatic teller machines (ATMs).

The ATM technology is a case in point. A study by Deloitte & Touche reported by the Associated Press (July 1995) noted that "As many as 450,000 bank jobs will disappear by the year 2000 ... as customers turn to electronic transactions...Automation will replace 151,000 workers and shifts to electronic delivery of services will eliminate an additional 300,000 jobs...The study echoes predictions made by bankers and their trade groups as slow revenue growth increases pressure to reduce expenses, and customers increasingly rely on ATM and phone banking."

The "Money & Business" section of The New York Times (Sept., 3, '95) carried an article entitled "500,000 Clients, No Branches" which described the latest trend in electronic banking and reported on a innovative bank

in Leeds, England:

> "For Catholics, it's Lourdes. For bankers these days, it's Leeds...Here in the shadow of a nuclear power plant, they find a sprawling hangar of a building that houses First Direct, a bank with a half million customers and not a single branch. Not only is First Direct the world's leading telephone-only bank; it is the fastest-growing bank in Britain. In just five years, it has signed up 2 percent of Britain's notoriously set-in-their-ways banking subjects, who call its rows of bankers 24 hours a day, seven days a week, to pay bills, buy stock and arrange mortgages... First Direct's computer allows it to create a virtual relationship with its customers, even though they may never speak to the same banker twice.

The article also foreshadows the extension of the trend to the U.S. and further describes the role that the newly merged Chase Manhattan and Chemical banks will play:

> "'Branches are becoming less and less significant in selling financial products,' said Walter Shipley, Chemical's chief executive. 'Not having branches could be an advantage as we leapfrog the physical delivery system.'"

As business and industry make greater use of telecommunications technologies, the expectations in the marketplace and the workplace are redefined. Consumers adapt to new applications of technologies and subsequently begin to transfer expectations to a variety of traditional environments, including education. For the growing number of consumers who experience and use direct banking, there will be new expectations that the convenience of asynchronous telecommunicated transactions can also be extended to education. If consumers can trust their financial transactions to telecommunications technology why should they not expect that educational program and services could be provided with the same degree of ease and access?

The shift in the marketplace and the workplace toward greater uses of technologies which provide asynchronous capabilities is in evidence in the results of a consumer poll conducted by IntelliQuest '95 and reported in USA TODAY. When asked "To keep up with the 'typical' American household which of the following do you need to own?" the response was a VCR by 71 percent, an answering machine by 70 percent, and a

computer by 59 percent. The same poll also asked "Is using a computer at home and at work a blessing or a curse?" The responses were as follows: 66 percent saw the situation as a "blessing," 3 percent saw this as a "curse," 22 percent "as both a blessing and a curse," and 8 percent saw it as "neither."

It is worthwhile noting that U.S. consumers purchased more PCs than TVs in 1994 (Business Week, March, '95). Moreover, the U.S. home PC market is the world's largest and will remain so until at least the turn of the century, due largely to employees who take work home, says a study conducted by International Data Corporation (IDC), a Framingham Massachusetts-based market research firm. The USA has a 55 percent share of the $24 billion-a-year global market for home PCs and 37 percent of U.S. households have one or more PCs, including systems provided by employers or schools. That compares with 30 percent in Belgium, the Netherlands, Luxembourg and Denmark; 28 percent in Germany; 24 percent in Britain; 15 percent in France, and less than 10 percent in Japan. The IDC study notes that U.S. consumers spend about 13 hours a week at their home computers, 80 percent of which is work-related.

As telecommunications networks expand, the computer is evolving from a number crunching tool to a global communications tool. In corporations, desktop computers are now arrayed in so-called client-server networks, where machines and people collaborate to do work in teams, representing a sharp break with the centralized control of traditional computing. Moreover, computers are playing a greater role in business and industry training activities. By 1997, the use of computer programs to train employees at their desks will make up 18 percent of corporate training budgets, up from less than 2 percent, in 1992.

Computers and telecommunications networks are shaping the design and the landscape of the workplace of the future. In the period of 1989 to 1993, the number of individuals who telecommute to work has better than doubled from approximately 3 to 7.6 million. As an example of the trend, "Nudging Workers From Comfy Nests," an article in The NewYork Times (July '95), notes that "At the end of 1993, AT&T had 21,000 employees telecommuting from home... By the end of 1994, the company had 35,000 people telecommuting. By the year 2000, it is forecast that the U.S. will have 25 million telecommuters and that two-thirds of U.S. workers will be "knowledge workers" engaged in America's knowledge-based economy.

The computer revolution has also deepened U.S. workforce division. In August, 1994, the U.S. Bureau of Labor Statistics reported the following information:

- o Ten years ago, 25 percent of American workers used a computer on the job. Today, that number is 47 percent.
- o Two-thirds of college graduates use computers at work, while only one-third of high school graduates use them.
- o Fewer than one tenth of high school dropouts use computers at work.

Government economists readily acknowledge that education and upgraded skills are no guarantee of a better job. However, without them, they argue, workers who are falling out of the middle class have little chance of returning.

2. Trends Analysis: Opportunities and Challenges

Enrollments shifts in higher education, economic forces in the workplace, and changes in technologies are creating new opportunities for distance learning and for technology-enhanced instruction. As increasing number of working adult students seek access to higher education, they will demand more time- and place-independent learning options and technology-based institutional support services. While higher education "brick and mortar" funds are decreasing, there will be new opportunities to develop technology and telecommunications infrastructures and to connect with students in their homes or in their workplace.

In a recent "Research File" article in the PBS AGENDA, Stan Cahill (PBS) and Wendy Charlton (CPB), report the following in "Consumer Survey Elicits Some Surprises:"

> "A surprising 67 percent of recently surveyed American households have someone who has taken at least two college-credit courses within the last six months. Also, 16 percent of those surveyed had taken a "distance learning" course at one time. Slightly more than half of those having taken distance learning courses indicated that these were the only type of course they took during the past term. Something that should sound familiar to distance educators -- 84 percent of these students said a very important reason for taking a distance learning instead of an on-campus course was because it fit in better with their work or home schedule.

One-third of those surveyed have access to Internet and/or Bitnet.

This timely study of the uses of communications technology in higher education was recently commissioned by the Corporation for Public Broadcasting (CPB) and carried out by SRI International. In addition to the student survey mentioned above, the study covered two other categories -- institutions (colleges and universities) and faculty...

The student portion of the study was conducted using a nationwide random-digit dial telephone survey method that resulted in 1,000 interviews with individuals who had completed two or more for credit college courses during the past six months. A total of 2,000 faculty at 100 colleges and universities were surveyed by both mail and a telephone follow-up effort.

For the institutional portion, surveys were conducted among a random sample of 1,000 colleges and universities (stratified by type and control of institution) focusing on six areas or topics: Chief Academic Officers, Instructional Uses of Computers, Instructional Uses of Other Technologies, Distance Education, Uses of Computer Technologies in the Libraries, Uses of Instructional Technologies in Teacher Education...

Instructional Uses of Computers
Regarding instructional uses of computers, 80 percent of the institutions responding currently provide access to the Internet and/or Bitnet and almost all of those without current access plan to provide it within the next three years. Computers (PCs) are available to faculty and students at 80 percent of the survey institutions. While only 13 percent said their institutions transmit video over the campus computer network at present, another 29 percent indicated they intended to add this capacity during the next three years...

Distance Education
A perfect 100 percent of the colleges and universities had offered for-credit distance education courses in the academic term just prior to the survey (including print-based courses), and 90 percent of them offered technology-based courses (namely, audio, video, or computer-based).

> When asked to predict the future of technology-based courses at their institutions, 95 percent of the respondents anticipated an increase. Queried about the use of video courses in particular, 46 percent said they were carried on a cable system, 37 percent on a public television station, and 27 percent for both telephone company lines and state or regional government delivery system (satellite or closed circuit, fiber-optic network, etc.) Given the wide variety of delivery systems available to colleges, 82 percent of those survey thought there would be an increase in technology-based courses received in student's homes over the next three years."

Support for trends information on technology-enhanced education and distance learning can also be found in the following results which are excerpted from the "Findings" section of Campus Trends 1995 - New Directions for Academic Programs, Higher Education Panel Report - No. 85, July 1995, published by the American Council on Education, Washington, DC:

> **Changes in the Next Five Years**
> Percentage of Institutions Reporting That Each Change is "Very Likely"
>
> 68% More courses using electronic materials
> 47% More courses through distance learning
> 36% Class assignments submitted electronically
> 35% Registration by telephone/computer
> 32% More participatory courses
> 25% One-stop student services
> 19% Fewer course sections available
> 19% More self-paced learning
> 08% Fewer majors available

The sample for the Campus Trends survey consists of 506 institutions that offer general programs of undergraduate instruction. It excludes specialized institutions (e.g., rabbinical seminaries, schools of art), institutions offering graduate instruction only, independent institutions that offer less than baccalaureate instruction, and other institutions that offer no general program of undergraduate instruction. The sample closely approximates and updates that which has been used in previous Campus Trends surveys.

The information surfacing through the multitude of surveys and studies merely reflects a well-defined pattern of use, application, and growth in distance learning. A national perspective of this trend is readily available from the Public Broadcasting Service (PBS). In the last 14 years, PBS, through its Adult Learning Service, has facilitated the enrollment of over 3 million students in telecourses that are nationally-distributed and offered locally through partnerships with public television stations, colleges, and universities. In 1995, PBS facilitated telecourse enrollment for 370,000 distance learners. The telecourse portfolio distributed through PBS provides sufficient courses to offer an AA degree in General Studies and a baccalaureate in Liberal or General Studies. There are over 60 college-level courses in the PBS telecourse portfolio.

3. Trends Analysis: Threats and Barriers

The advent of the Information Age is indeed threatening to those who want to preserve the status quo. However, higher education can no longer afford to ignore the forces that are changing all other aspects of our lifestyles. To survive in the 21st century, higher education must undergo a paradigm shift from a culture that has defined education as a "classroom process" driven by facilities and a faculty-centered focus to a "learning-centered process" driven by broad access to asynchronous information technologies and a student-centered focus.

This proposed paradigm shift will necessitate a long-term commitment to change advocacy. Predictably, change can be perceived as a threat to those who remain intellectually and emotionally vested to current processes and methods. To ease the transition, higher education will need to devote greater resources to professional development and new incentives will need to be incorporated in compensation and rewards packages for personnel. A large number of activities, funding-formulas and deeply ingrained processes or traditions, which are now considered sacrosanct, will need to be reviewed, revised and possibly abolished.

Moreover, the paradigm shift will also necessitate an increased emphasis on customer service and value-added benefits as more working adult students and/or sponsoring employers exercise their consumer rights and select from a wide range of educational providers whose programs and services will transcend geographic boundaries, and be time- and place-independent, as well as responsive to their perceived education or training needs.

For most traditional higher education institutions, those that have existed under an umbrella of protective or protectionist state and local policies, the threat will seem to be substantial. On the other hand, institutions that have restructured, or are now actively adapting to meet the challenges of the information age, will reap the benefits from the opportunities created by the changing forces in our society.

4. Trends Analysis: Implications for Institutional Action

In developing its Distance Learning and Technology Plan, Brevard Community College (BCC) has identified strategies that promote or address:

- A systemic review and revision of institutional policies, procedures, and personnel agreements to empower the institution to be an "agile" organization that can be responsive to the societal, demographic, and technological changes of the Information Age.

- A proactive approach to the development of information technology infrastructure and the deployment of instructional technologies and distance learning delivery modes to facilitate time- and place-independent learning or just-in-time learning.

- A systemic review or reform of curricula to improve the integration of knowledge and to infuse instructional technologies into the learning processes.

- A systemic review of institutional and instructional support services to expand technology-based delivery while enhancing the level of service.

- A systemic review of the institutional mission statement to redefine learning as a "learner-centered" process.

B. Distance Learning and Technology Plan: Goals

The BCC Distance Learning and Technology Plan is an institutional commitment to the following goals:

- Improve access to courses, to entire curricula, and to AA and AS degrees by providing time- and/or place-independent learning services, activities, and courses.

- Improve time-to-degree by facilitating acceleration of studies through technology-enhanced learner-centered learning environments and student-centered scheduling.

- Improve productivity through better utilization of technology and distance learning resources.

- Improve quality of teaching and learning by infusing technology and by integrating distance learning across the curriculum.

- Improve telecommunications infrastructure to benefit all college constituencies and to remove institutional barriers or obstacles to facilitate access to just-in-time learning.

- Improve inter-institutional collaboration with four-year institutions to create a seamless learning and training environment for all college constituencies.

- Improve inter-institutional collaboration with other community college to create a seamless learning and training environment for unique or highly specialized courses, curricula, and degrees.

- Improve institutional technology utilization and instructional technology applications through on-going training activities and educational programs focused on identified needs of faculty, staff, students and the community-at-large.

C. Distance Learning and Technology Plan: Institutional Plan and Strategies

Brevard Community College will make use of a wide range of technologies to advance its institutional mission and to meet the goals previously stated. The strategies and technologies focus inward, as well as outward.

1. Technology Strategies

First and foremost, BCC is committed to a long-term upgrade of its collegewide telecommunications infrastructure and networks with the intent to integrate voice/data/video and to provide comprehensive services on the desktop of all faculty and staff at all four campuses (Cocoa, Melbourne, Titusville, and Palm Bay). In addition, BCC is also committed to a long-term strategy to provide student access to a virtual electronic campus that parallels the four geographical campuses, in student services, curricular and co-curricular activities, and curricular course offerings.

Currently, Brevard Community College uses the following technologies and plans to make continuous improvements to these delivery systems:

a. Broadcast Television, WBCC-TV68

Overview - As the educational television station of Brevard Community College, WBCC is uniquely positioned to extend the vast resources of the college and those of its numerous educational partners. Channel 68 dedicates 100 percent of its broadcast programming schedule to the delivery of educational programs and also plays a significant role in supporting instructional functions by providing a host of narrowcast media-based services.

WBCC serves the educational needs of a diverse population by providing focused instructional services and programming through alliances and partnerships with all constituencies in its regional service area. With access to 99 percent of households in its signal area, WBCC is the most efficient delivery means to serve the ever growing educational needs of our information age community. The broadcast delivery system provides universal access regardless of address or economic status (see **Appendix A** for channel coverage area).

In the last few years, Brevard Community College's distance learning program has experienced dramatic growth as WBCC-delivered telecourses have increased in number to 45 per term --fall and spring -- and as annual enrollment reached 3,700, in academic year 1994-95 (see **Appendix B** for enrollment growth). In addition to the telecourse program, WBCC provides 10 hours of weekly programming support to Brevard County Public Schools (BCPS), and it assists BCPS with the teleproduction of a television program targeted to meet the identified needs of BCPS.

Plan - Brevard Community College recently submitted to the state its statement of "Educational Specifications for an Educational TV Station, WBCC-TV68" to obtain approval and funding for a new building and for new equipment to replace the current television facility. WBCC currently operates from an undersized facility which is housed in converted space within the former Cocoa Campus library building.

Brevard Community College projects an expanded role for distance learning and anticipates that the resources of an enhanced telecommunications facilities will facilitate new and improved distance learning programs and services. The new facilities are also designed to improve the versatility of educational and instructional services that WBCC can provide.

b. ITFS/Wireless Cable, Point-to-Multipoint

Overview - WBCC operates an ITFS wireless system in partnership with Coastal Wireless, Inc. WBCC holds the licenses to this system which was funded and constructed by Coastal Wireless, Inc. Brevard Community College currently programs one ITFS channel. Additional channels are available and can be brought online as needed. The ITFS system reaches an approximate 12,000 subscribers including most public school facilities and a large number of business and nonprofit sites such as hospitals, fire stations, and the Kennedy Space Center, as well as large corporate entities, such as: Harris Corporation.

Plan - Although the current WBCC programming on the ITFS system is focused on K-12 support with programming emphasizing professional development for K-12 teachers and staff, Brevard Community College has launched a number of initiatives to reach other segments of the community including the business/government/industry sector with workplace training.

In the future, WBCC and Coastal Wireless will scramble an ITFS channel and deliver workplace training and both credit and noncredit instruction to remote sites that will have subscribed to the "workplace channel" through an annual membership. In addition, BCC is working with the University of Central Florida (UCF) to develop the full utilization of an ITFS channel that will provide an articulated 2+2 distance learning option for residential and commercial subscribers of the ITFS Wireless system.

c. Microwave, Point-to-Point, Two-Way Interactive Television

Overview - WBCC's microwave communications T.I.E system enables courses and local videoconferences to originate or be received at any of Brevard Community College's four campuses. The system can simultaneously connect four multi-camera electronic classrooms to provide two-way video and two-way audio interactive instruction or conferences. This interactive telecommunications system allows for the productive, efficient delivery of courses which cannot be replicated on each campus. In addition, the system facilitates the redistribution and "live wrap-around" of televised instruction originating from the Orlando Campus of the University of Central Florida or from Tallahassee for the joint Florida State University and University of Florida graduate level professional development program in Community College Leadership.

Plan - The two-way interactive teleclassroom will continue to grow in use as Brevard Community College involves more faculty and staff in distance learning activities and programs. The T.I.E.teleclassrooms provide an excellent vehicle to aggregate personnel from the four campuses while simultaneously demonstrating the use of instructional technologies, an extended learning environment, and/or distance learning methodologies.

d. Satellite-Receive (TVRO)

Overview - C-Band and Ku-Band downlinks are available on all four campuses and facilitate community-wide access to a host of satellite-delivered professional development programs and live interactive videoconferences. WBCC can also take live or taped satellite feeds and easily retransmit or redistribute the programs on WBCC-TV68, ITFS Coastal Wireless System, and the T.I.E. teleclassroom system, as well as numerous locations on the Cocoa Campus, including the joint use facilities of BCC and the University of Central Florida/Brevard.

Plan - Brevard Community College will want to upgrade and/or expand its TVRO system to retain its state-of-the-art position and to take advantage of digital video systems that are emerging. The current system is reaching "events saturation" as more programs require simultaneous reception.

Brevard Community College also wants to position itself as a telecommunications center to fully serve its constituencies and to participate in appropriate "turnkey" videoconferencing services whether they originate within the state or elsewhere.

e. Cable Television

Overview - WBCC-TV68's television broadcast channel is retransmitted and redistributed on numerous cable television systems (see **Appendix A**). As a result, the signal coverage area of WBCC reaches nearly 1.2 million viewers.

Plan - Brevard Community College has been actively involved in a countywide planning task force which has been working with Time-Warner Cable to plan for fiber optics deployment by Time-Warner Cable in Brevard County and to help specify the scope of telecommunications services anticipated by BCC and other county agencies. In the future, BCC will continue to be involved in these interagency planning activities and will eventually take advantage of new telecommunications networks when they are deployed.

f. Computer-Assisted-Instruction and Self-Paced Multimedia

Overview - Brevard Community College has two operating Computer-Assisted-Instruction (CAI) labs located in the joint-use BCC/UCF library on the Cocoa Campus. An additional CAI lab is located on the Melbourne Campus.

The PLATO lab began with 30 computers in 1994, and 20 more will be added in 1995. Students are assigned one hour a week in the lab for each college prep class they are taking, working on PLATO lessons assigned to them by their instructors. Instructors receive periodic reports showing which lessons students have mastered and how much time has been spent working on each assignment (see **Appendix C1 & C2**).

The Academic System's Lab was first implemented with Academic System's Introductory Algebra. This CAI lab has 30 state-of-the-art PowerMac 6100's connected via network to a Macintosh Quadra as the server. The Introductory Algebra software guides each student through a learning program which covers Real Numbers through Quadratic Equations. The software is divided into topics which present instruction in a variety of formats--text, hypertext, graphics, animation, simulation, and visualization. Along with these formats, full-motion video and digital audio are sent across the network to create a unique learning experience (see **Appendix D**).

Plan - Brevard Community College will continue to expand its CAI labs' capabilities to afford faculty and students the best in self-paced mediated instruction. As telecommunications capabilities improve, the labs will be networked in an inter-campus configuration and eventually in an inter-institutional configuration with other collaborating institutions. The CAI labs will play a prominent role in enhancing courses which demand assimilation time, time-on-task for skills development. In addition, the labs can overcome the lock-step sequencing that creates barriers to in-term advancement, and eventually, "time-to-degree."

g. Information Highway: Computer-Conferencing & Virtual Campus

Overview - Brevard Community College has been experimenting with computer-conferencing and has demonstrated the benefits of this mode of telecommunications through its initial use of a Bulletin Board Service (BBS) which was established to support the WBCC-delivered telecourse program. The BBS computer-conferencing and information service enhanced the learning environment by providing a new level of interactivity between faculty and students and among students within a course. General and timely information from the Student Services area further enhanced the learning environment.

Effective October 1995, BCC has launched a new distance learning initiative which builds on both the telecourse program and the BBS computer-conferencing experiment and demonstration project. Through a partnership with the Community College for International Development (CCID) and the Electronic University Network (EUN) on **America Online** (AOL), Brevard Community College is now offering distance learning courses online via AOL, in a new consortium called the **World Community College (WCC)**.

Plan - The BCC/WCC initiative is more than just a distance learning program. BCC is establishing a "**virtual campus**" which will recreate the functions and structures of the physical/geographical facilities in Brevard County on WCC/EUN-America Online. Distance learning students will have the opportunity to experience conventional aspects of campus life, activities, support services, and courses leading to entire degree programs in a virtual environment which is readily available, easy to use, and complemented by a vast array of electronic resources. Students will be able to register, be advised, participate in student lounges, join clubs, have access to the college newspaper, and take classes where they will participate in "threaded discussions" with their instructors and with fellow students. Other pertinent materials-- videocassettes, textbooks, teleguides, and computer software will be mailed directly to students prior to the start of the course.

This initiative will accommodate credit and noncredit offerings and will be offered to admitted students regardless of residence. Brevard Community College is collaborating with the corporate multinational community and international organizations to identify curricula and telecommunications capabilities.

The following Associated Press article, which was published in Florida Today, Tuesday, October 3, 1995, conveys how information technology is rapidly changing the face of the globe and how the U.S. is in a leadership position:

> "**U.S. ready for multimedia,** Geneva - Americans are ahead of the rest of the world in preparing for the next big leap in telecommunications, a U.N. agency said Monday.
>
> A survey of the number of telephone lines, TV sets and personal computers per inhabitant ranks the United States first among 39 countries in ability to use multimedia services combining telecommunications, broadcasting and computing.
>
> In the rankings, industrial giants such as Germany and Japan barely made the top 10.

> Denmark was second to the United States, followed by Canada and Sweden. Tied for fifth place were Australia, France and Switzerland, with the Netherlands eight, Germany ninth and Japan 10th. India was in last place.
>
> The International Telecommunications Union released the survey in a 232-page report in advance of the opening Tuesday of Telecom '95, the world's once-in-four years chance to try out the latest technology and dream about the future.
>
> The agency said no one really knows exactly how people will be using telecommunications to get information, entertain themselves and talk to each other in coming years.
>
> But it says one thing is sure: The countries with extensive phone and cable TV systems and with telephone, computers and television sets all in the same home or office are in the best position.
>
> The report lumps all three types of technology under what it calls the "infocommunications industry," which it said has become practically recession-proof, with revenues last year of $1.43 trillion, or 6 percent of the world economy.
>
> The number of phone lines around the world surpassed 645 million last year, more than one for every 10 people."

Brevard Community College has recognized that the Information Age is upon us and that the U.S. is clearly positioned to provide leadership in distance learning using the resources of the "infocommunications industry."

h. Internet Access

Overview - As noted in the introduction to this section, BCC is committed to a long-term upgrade of its collegewide telecommunications infrastructure and networks with the intent to integrate voice/data/video and to provide comprehensive services on the desktop of all faculty and staff on all four campuses. Brevard Community College currently provides e-mail Internet access to all desktops via a VAX terminal system and "All-in-1" software.

Plan - The plan to continuously upgrade the infrastructure is also a commitment to expand access to a greater variety of Internet services to every desktop and to increase overall capabilities at the desktop level. In addition, BCC is also committed to a long-term strategy to provide student access to a "virtual electronic campus." BCC will continue to develop and to enhance its "Home Page" on the World Wide Web.

In addition to the technologies just described, Brevard Community College is currently in the planning, deployment, experimentation, or demonstration phase for the following technologies:

a. ISDN, compressed video at the desktop

Overview - Brevard Community College is the subcontractor on a U.S. Department of Labor grant awarded to the Brevard Workforce Development Board (BWDB), formerly the Space Coast Private Industry Council (PIC). Funds are being made available to demonstrate how telecommunications technology and distance learning can be used to facilitate access to job training and placement.

Plan - BCC and BWDB will use a number of technologies and strategies to meet the objectives of the grant. Moreover, the project will use the AT&T Vistium desktop video system connected by BellSouth ISDN lines in a switched system which will allow any two of the seven Job Links sites and BCC's Cocoa Campus to be interconnected in real-time desktop video configuration with document sharing capabilities.

b. Satellite-Transmit (uplink)

Overview - Brevard Community College continues to explore a variety of possibilities for the acquisition of an uplink.

Plan - BCC will continue to seek external funding to acquire a satellite uplink to complement its current array of distance learning delivery systems.

c. Video-on-Demand, Time-Warner Cable

Overview - Brevard Community College has been meeting with Time-Warner Cable to explore future relationships for the development and delivery of educational programs and services.

Plan - BCC will continue its planning and development activities to take advantage of the opportunities created by the fiber optics video-on-demand system that Time-Warner Cable is building and deploying in Central Florida, including Brevard County.

2. Curricular Strategies

Brevard Community College is dedicated to offering comprehensive course offerings and when appropriate entire degree programs through distance learning and technology-based delivery systems.

BCC is a pilot site and a participating institution in PBS' **Going the Distance**. The project proposes to facilitate the development and the delivery of distance learning degree programs as part of a national initiative. Brevard Community College is offering its students the ability to complete an AA degree exclusively through distance learning delivery options.

BCC is also a charter institution in the World Community College and the initiative to extend distance learning opportunities via America Online through a "virtual campus" configuration which enables high-levels of interactivity and interaction. BCC will offer over ten degree programs through the auspices of WCC and America Online.

3. Learner Support Strategies

Brevard Community College is dedicated to providing comprehensive learner support services to its student body by using state-of-the-art telecommunications technologies. Although BCC will support all its students through enhanced technological capabilities, the college will insure that distance learning students have equal access to these services.

The "virtual campus" which BCC is creating under the auspices of WCC and America Online enables the college to replicate the learner support services found in a more conventional campus setting while providing time- and place-independent access.

D. Distance Learning and Technology Plan: Inter-institutional Plan and Strategies

Overview - Brevard Community College advocates the concept of a comprehensive plan which would focus on the development and enhancement of instructional technologies and the upgrade of telecommunications infrastructure at our 28 community colleges and their 54 campuses.

Plan - More specifically, BCC supports an initiative to empower individual community colleges to equip their campuses with technology and to upgrade their telecommunications capabilities with the purpose of creating a statewide network of "smart campuses." Ideally, the campuses should share certain basic design and facilities' features to enable inter-institutional and inter-campus telecommunications of voice, data, and video signals, in an inter-operable configuration.

Our assumption is that the telecommunications industry is actively developing the telecommunications networks to reach and to connect our individual institutions and campuses with the very latest technologies. The 1995 passage of Florida SB1554 which deregulates the telecommunications industry should create a highly competitive environment and should provide higher education institutions with greater choices and expanded access to a wide range of telecommunications services.

Our challenge is to insure that our respective institutions and campuses are equally prepared to take advantage of the telecommunications revolution which is taking place. More specifically, our task is to upgrade our campus telecommunications infrastructure and to empower our faculty, staff, and students with technology-assisted teaching and learning tools, including the availability of distance learning delivery modes.

In meeting this challenge, we can act independently or we can develop a comprehensive approach through a collaborative process. Economics of scale and a coordinated planning process supported by a united front would dictate that we would be better served by working collaboratively. If that is the case, what goals and objectives should we pursue?

Strategies - We should focus on the following three broad areas:

1. Telecommunications Infrastructure

- o To upgrade campus infrastructure by enabling and facilitating the expansion of institutional Wide Area Networks (WANs) to accommodate distribution of voice, data, and video.

- o To enable campus hook-up to the Internet and to facilitate faculty/staff/student access to the Internet.

- o To enable access to a statewide switched video network for inter-institutional or inter-campus videoconferencing and/or distance learning instructional delivery.

2. Hardware and Facilities

- o To establish and to equip near-identical networked-capable facilities to facilitate distributed learning and distance learning as well as videoconferencing across all 54 campuses. More specifically, each campus would have the following near-identical facilities:

  - An internally networked computer lab equipped with multimedia PCs which could be networked externally (minimum 20 stations).

  - A dedicated "telelearning room" which could be connected by a statewide/national switched video network (minimum seating for 20).

  - A "videoconferencing room" which could be connected by a statewide/national switched video network (minimum seating 10).

3. Technology-Based and Distance Learning Courseware Development

- o To establish and to fund a shared or collaborative courseware development process to address identified statewide instructional needs and/or priorities. This development process could be supported through a pool of appropriate funds.

- Courseware developed for use in the previously referenced networked multimedia PC labs.

- Courseware developed for use in the previously referenced networked telelearning/videoconferencing rooms.

- Courseware developed for distribution via the Internet or through America Online, CompuServe, Prodigy, Microsoft Network, MCI Mail, and other such electronic networks.

- Courseware developed for distribution through satellite/broadcast/cable television, through videocassettes, through video servers in a video-on-demand environment, or through PC desktop video ISDN capabilities.

- Courseware developed using PC-based "authoring systems" for computer-assisted instruction (CAI), computer-managed instruction (CMI), or for CD-ROM and other emerging technologies.

Our ultimate goal in advocating and supporting this plan is to anticipate the State's changing demographics, the next "tidal wave" of high school graduates, the increasing number of adult working students, and the diminishing resources for traditional "brick and mortar" facilities. Moreover, this initiative hopes to demonstrate that Florida community colleges can design cost-efficient and learning-effective environments for the growing number of students and workers who need to be prepared to function--learn and work-- in our "Information Age."

E. Distance Learning and Technology Plan: Partnerships

University of Central Florida - BCC and UCF currently collaborate in the delivery and distribution of distance learning courses offered through the ITFS network in Brevard County. Future plans include the development of a distance learning 2+2 program through an AA degree in General Studies and a BA in Liberal Studies.

Solar Energy Center - The Center is located on BCC's Cocoa Campus and is interconnected by fiber optics to the BCC telecommunications network, including WBCC. The Center and BCC are collaborating on the development of a curriculum in "Alternative Energy Sources" for delivery via distance learning technologies.

PBS Adult Learning Service - BCC is a pilot site in the PBS **Going the Distance** project which proposes to facilitate the development and delivery of distance learning degree programs through a national initiative. Brevard Community College is offering its students the ability to complete an AA degree exclusively through distance learning delivery options.

Brevard County Public Schools - BCC, in close cooperation with Brevard County Public Schools, selects and broadcasts, on Channel 68, programming which supports the instructional function of the K-12 curricula and the in-service development needs of teachers.

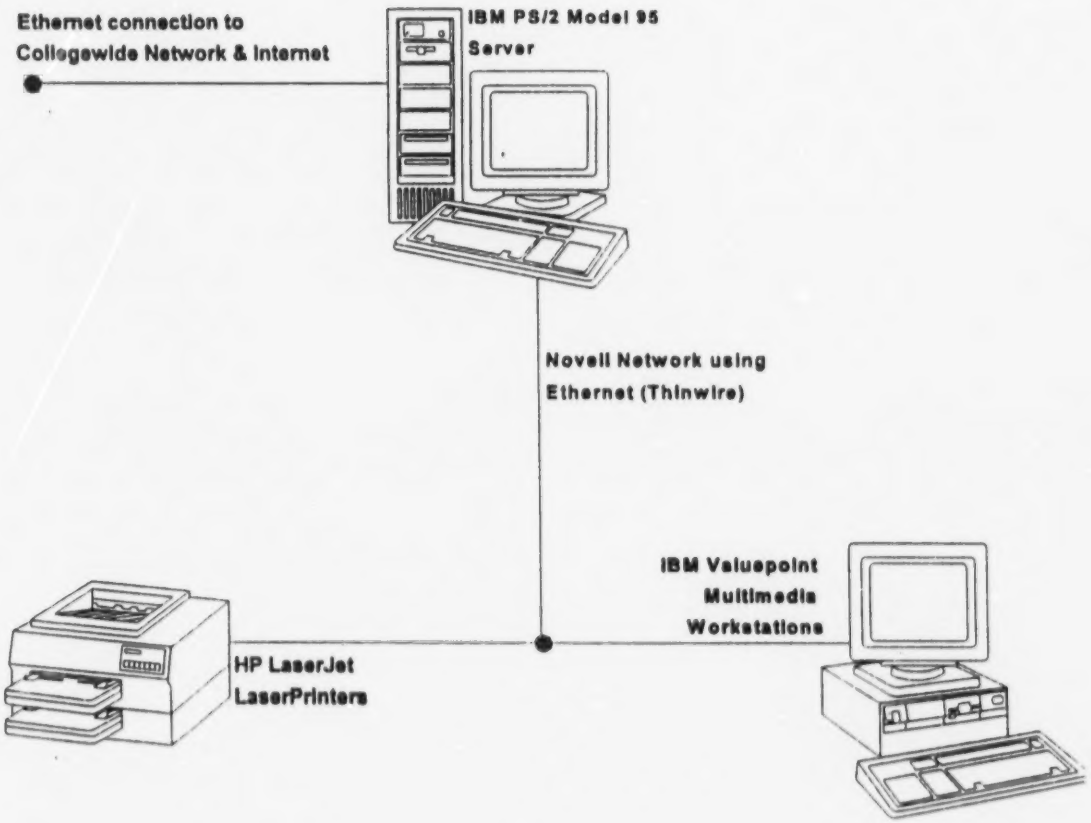
Central Florida Consortium of Higher Education (CFCHE) - This is a regional consortium with membership from six community colleges, including BCC and the University of Central Florida. The membership institutions are currently collaborating on a major distance learning project with the assistance of a grant funded by the 1994 Florida Legislature. Under this project BCC is a primary participant in the development and teleproduction of an "Introductory Course in Distance Learning."

Instructional Leadership Development Through Distance Learning - This distance learning project also funded by the 1994 Florida Legislature brings together nine community colleges, including BCC, and Florida State University and the University of Florida. BCC as a participating institution is facilitating the distance learning delivery of a graduate program and/or graduate level professional development program to its faculty and staff.

Coastal Wireless, Inc. - BCC and Coastal Wireless maintain a close working relationship which supports the development and maintenance of the college's ITFS system and microwave two-way interactive teleclassrooms.

BCC TITLE III COCOA CAI LAB

PLATO System ARCHITECTURE



The PLATO lab began with 30 computers in 1994, and 20 more will be added in 1995. Students are assigned one hour a week in the lab for each college prep class they are taking, working on PLATO lessons assigned to them by their instructors. Instructors receive periodic reports showing which lessons students have mastered and how much time they have spent working on each assignment.

BCC TITLE III
MELBOURNE CAI LAB

FACILITIES

2,400 SQUARE FEET
56 IBM 486 COMPUTERS
4 MACINTOSH COMPUTERS
6 LASER PRINTERS
INTEGRATED NOVELL NETWORK

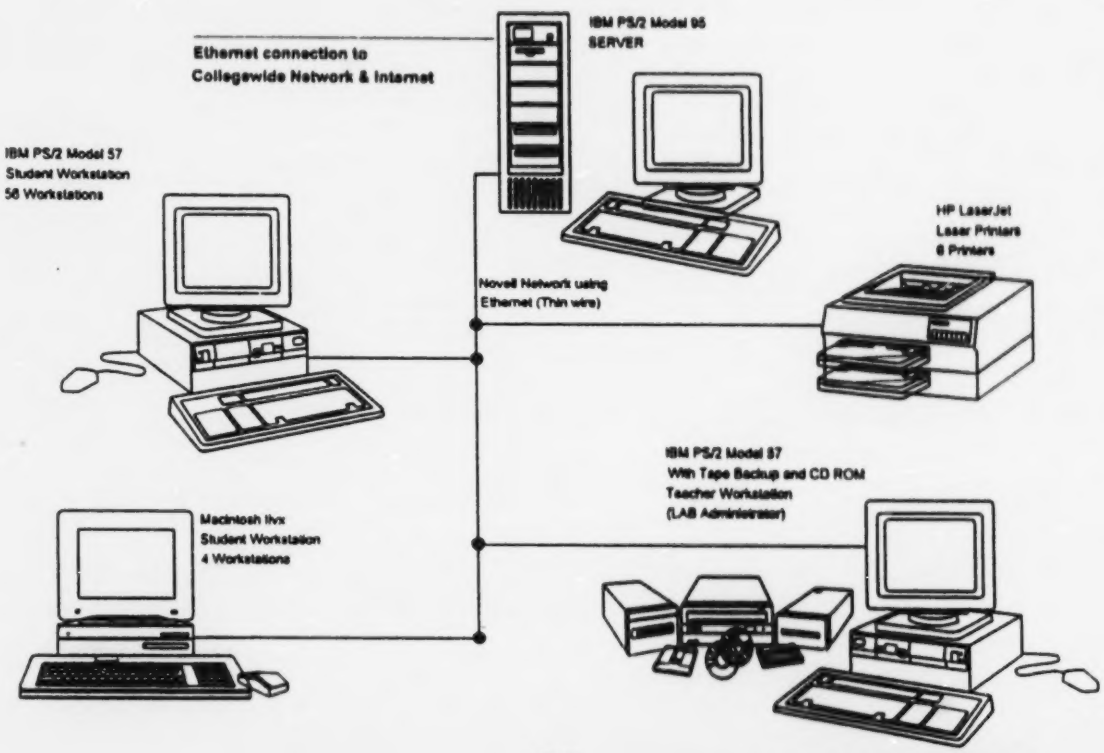
STAFF

1 FULL-TIME FACILITATOR
1 FULL-TIME COMPUTER SPECIALIST
9 PART-TIME, CROSS-TRAINED TUTORS
6 STUDENT WORKERS

USAGE

DAILY AVERAGE TIME LOGGED ON - 96 HOURS
DAILY AVERAGE VISITS - 139
DAILY AVERAGE APPLICATION LOGINS - 190
OVER 60% OF PREP STUDENTS USE THE LAB

SYSTEM ARCHITECTURE



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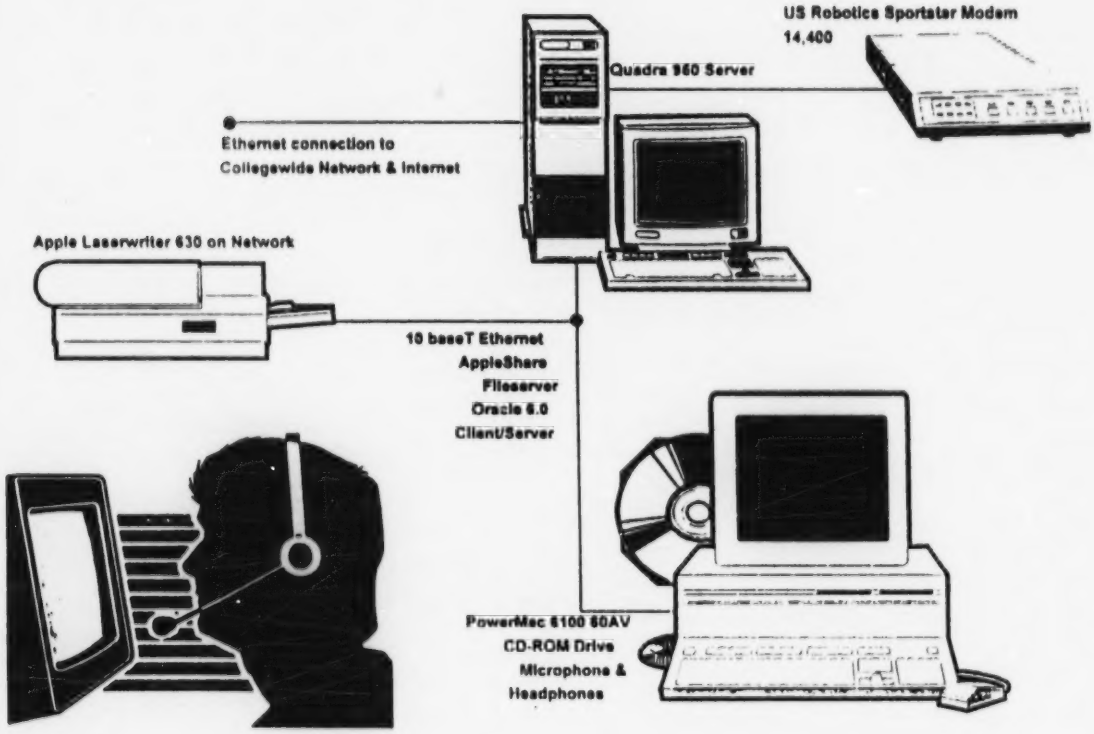
ACADEMIC SYSTEMS SOFTWARE CONFIGURATION



First implemented with Academic Systems' Introductory Algebra, this computer Assisted Instruction lab has 30 state-of-the-art PowerMac 6100's connected via network to a Macintosh Quadra as the server.

The Introductory Algebra software guides each student through a learning program which covers Real Numbers through Quadratic Equations. The software is divided into topics which present instruction in a variety of formats--text, hypertext, graphics, animation, simulation, and visualization. Along with these formats, full-motion video and digital audio are sent across the network to create a unique learning experience.

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